

Honors PreCalculus '20-21  
Dr. Quattrin  
Polynomials Test  
CALCULATOR ALLOWED  
Round to 3 decimal places.

Name: \_\_\_\_\_

Score \_\_\_\_\_

1. Given this sign pattern  $f'(x)$   $\leftarrow \begin{array}{ccc} - & 0 & + & 0 & - & 0 & - \\ & -4 & & -1 & & 2 & \end{array} \rightarrow$ , at what value of  $x$  does  $f$  has a relative minimum point?

- a)  $-4$    b)  $-1$    c)  $2$    d)  $-4$  and  $2$    e)  $-4, -1,$  and  $2$
- 

2. The minimum value of  $f(x) = \frac{4}{\sqrt{x}} + 3\sqrt{x}$  is

- a)  $\frac{3}{4}$    b)  $\frac{4}{3}$    c)  $\frac{19\sqrt{3}}{2}$    d)  $4\sqrt{3}$    e) No such value
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3. Consider a particle moving such that its position is described by the function

$x(t) = \frac{t^4}{2} - \frac{t^5}{10}$ . When does the particle attain its maximum position?

- a)  $t=0$                       b)  $t=1$                       c)  $t=2$   
d)  $t=3$                               e)  $t=4$
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4. If  $g$  is a differentiable function such that  $g(x) < 0$  for all real numbers  $x$  and if  $f'(x) = (9 - x^2)g(x)$ , which of the following is true?

- a)  $f(x)$  has a relative maximum at  $x = -3$  and a relative minimum at  $x = 3$ .  
b)  $f(x)$  has a relative minimum at  $x = -3$  and a relative maximum at  $x = 3$ .  
c)  $f(x)$  has relative minima at  $x = -3$  and  $x = 3$ .  
d)  $f(x)$  has relative maxima at  $x = -3$  and  $x = 3$ .  
e) It cannot be determined if  $f$  has any relative extrema.
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5. The absolute minimum value of  $g(x) = -x^3 + 2x^2$  on  $[-1, 3]$  occurs when  $x$   
=

- a) -1    b) 0    c)  $\frac{4}{3}$     d) 2    e) 3
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6. What are all values of  $x$  for which the function  $f(x) = 2 - 3x - x^2 + \frac{1}{3}x^3$  is  
decreasing?

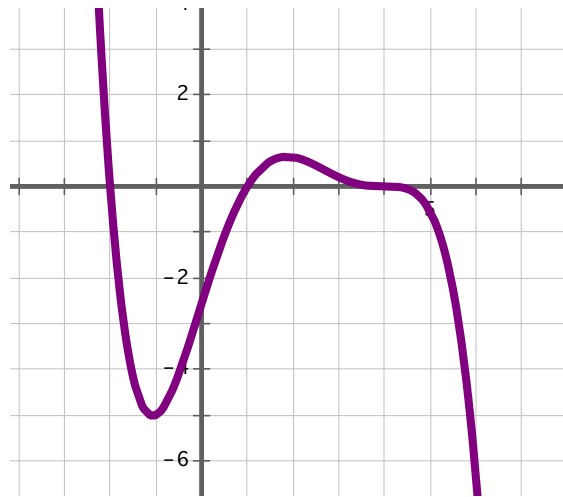
- a)  $-1 < x < 3$   
b)  $-3 < x < 1$   
c)  $x < -3$  or  $x > 1$   
d)  $x < -1$  or  $x > 3$   
e) All real numbers
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7. Given this sign pattern  $f'(x)$   $\leftarrow \begin{array}{c} - \quad 0 \quad + \quad 0 \quad - \\ -3 \qquad \qquad 1 \end{array} \rightarrow$ , on which interval(s)

is  $f(x)$  decreasing?

- a)  $-3 < x < 1$
- b)  $x < -3$  and  $x > 1$
- c)  $x < -3$
- d)  $x > 1$
- e) It cannot be determined from this sign pattern

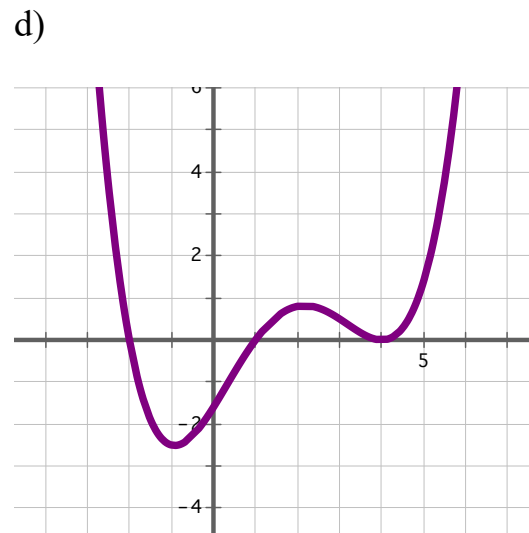
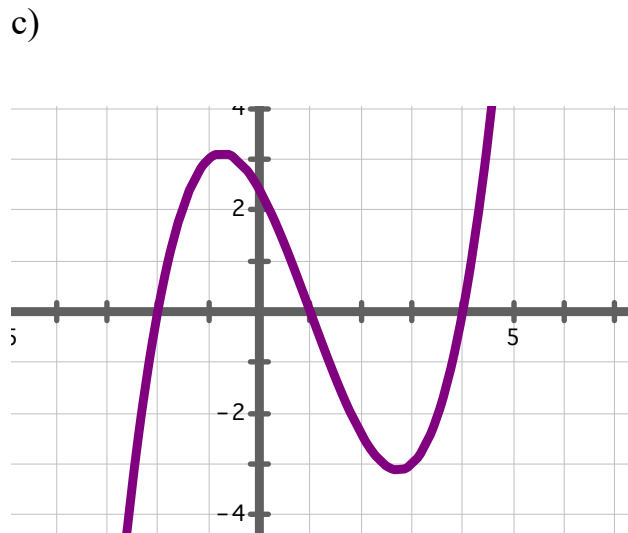
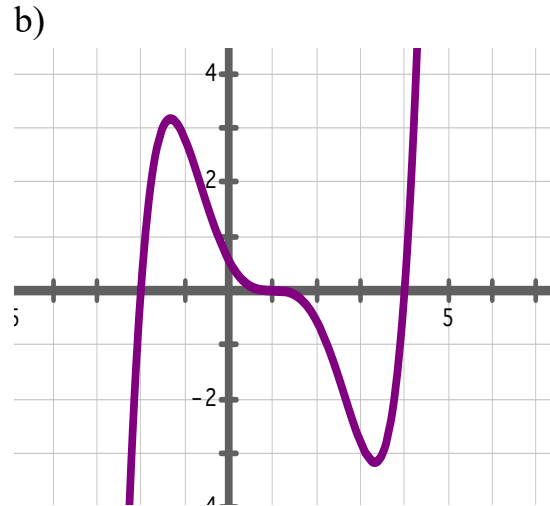
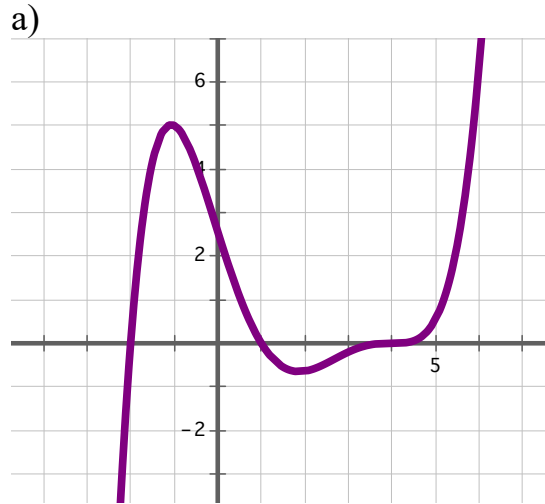
8. Which of the following equations matches this graph:



- a)  $y = -.07(x+2)(x-1)^3(x-4)$
- b)  $y = -.3(x+2)(x-1)(x-4)$
- c)  $y = -.05(x+2)(x-1)(x-4)^2$
- d)  $y = -.02(x+2)(x-1)(x-4)^3$

9. Which of the following graphs matches the equation

$$y = .05(x+2)(x-1)(x-4)^2$$



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Polynomials Test-- CALCULATOR ALLOWED

Round to 3 decimal places.

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Show all work.

1. Find the zeros and extreme points of  $y = -3x^3 + 2x^2 + 147x - 98$ . Show the algebraic work to support the zeros and critical values.

2. Find the zeros and extreme points of  $y = 4x^3 - 12x^2$  on  $x \in [-1, 4]$ . Show the derivative and algebra to support the critical values.

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3a. Find the zeros, algebraically, of  $y = 4 + 8x - x^2 - 2x^3$ .

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3b. Find the extreme points of  $y = 4 + 8x - x^2 - 2x^3$ . Show the derivative before using your calculator.

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Polynomials Test—CALCULATOR NOT ALLOWED

Show all work.

Score \_\_\_\_\_

4. The sign pattern for the derivative of  $H(x)$  is given. (a) Is  $x = -4$  at a maximum, a minimum, or neither? Why? (b) Is  $x = 2$  at a maximum, a minimum, or neither? Why?

$$\begin{array}{ccccccc} & - & 0 & + & 0 & + & 0 & - \\ & & & & & & & \\ \frac{dH}{dx} & \leftarrow & & & & & & \rightarrow \\ x & & -4 & & -1 & & 2 & \end{array}$$

a)

b)

5. Find the traits and **sketch**  $y = 4x^3 - 12x^2$  on  $x \in [-1, 4]$ .

Domain:

Range:

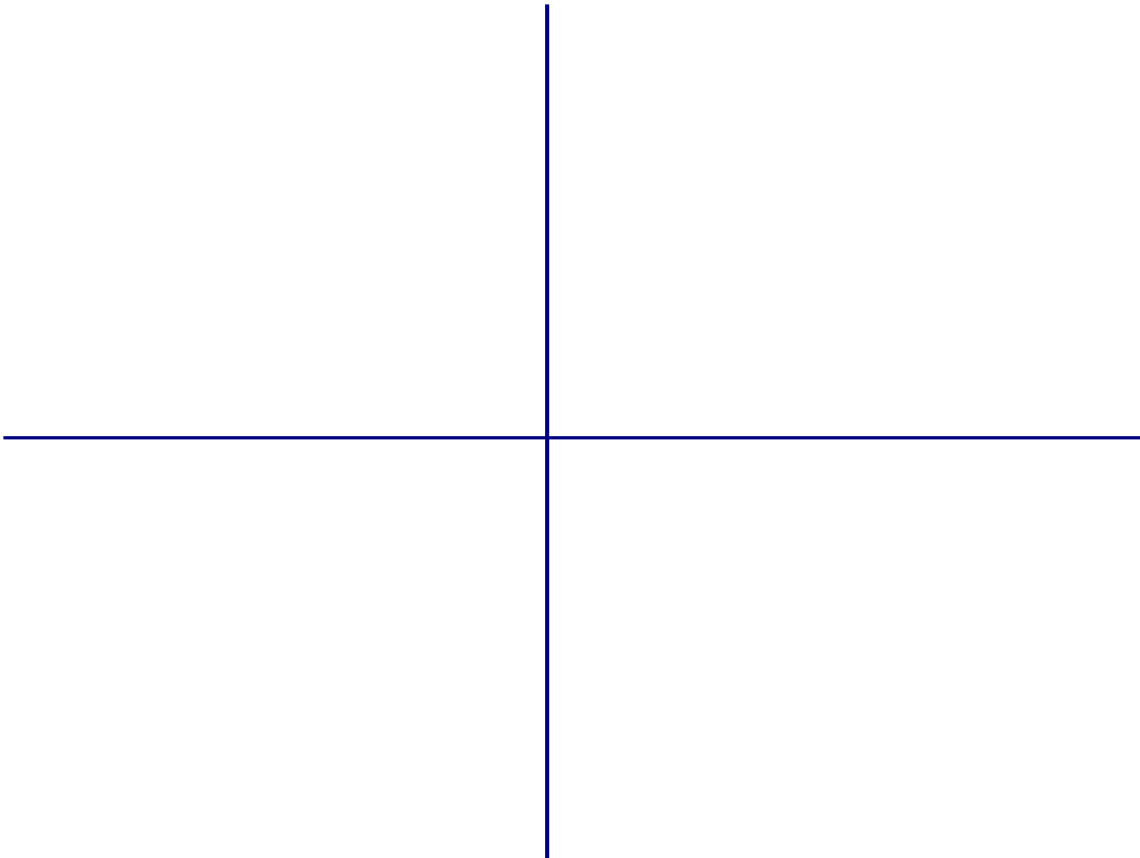
Zeros:

$Y$  – Int:

End Behavior (left):

Extreme Points:

End Behavior (right):



6. Find the traits and **sketch** of  $y = -3x^3 + 2x^2 + 147x - 98$ .

Domain:

Range:

Zeros:

Y - Int:

End Behavior (left):

Extreme Points:

End Behavior (right):

